

WORKING GROUP ON THE EVALUATION
OF THE HAZARDS OF HARMFUL
SUBSTANCES CARRIED BY SHIPS

31st session
Agenda item 8

REPORT OF THE THIRTY-FIRST SESSION

1 INTRODUCTION

1.1 The thirty-first session of the GESAMP Working Group on the Evaluation of the Hazards of Harmful Substances Carried by Ships was held at IMO Headquarters, London, from 28 August to 1 September 1995 under the chairmanship of Dr. P. G. Wells.

1.2 The IMO Technical Secretary of GESAMP, Dr. M. Nauke, welcomed the Working Group on behalf of the Secretary-General of IMO and the Director of the Marine Environment Division. He emphasized that most of the work during this meeting should be devoted to a review of the current procedures for the evaluation of the hazards of harmful substances carried by ships, which had been used since the early 1970s and were part of the terms of reference of this Working Group. At the request of IMO's Marine Environment Protection Committee (MEPC), an expert panel met during the previous week to evaluate the existing hazard rationale and to recommend revisions that would update the procedures in the light of scientific findings, research, development and experience gained with the evaluation procedures since these had been adopted in 1972 for the implementation of MARPOL 73/78.

1.3 A list of members of the EHS Working Group is shown in annex 1. The agenda for this session as adopted by the Working Group is shown in annex 2.

2 RESULTS OF THE EXPERT PANEL'S REVIEW OF THE GESAMP EVALUATION PROCEDURES

2.1 The Working Group considered the recommendations of the expert panel described in its report shown in annex 3 and concluded that a new hazard evaluation rationale could be established on the basis of the current procedures by re-arranging hazard profiles, adding a number of criteria, and by clarifying descriptions and definitions. This would not only increase the value of information on the hazards of substances that have been and will be evaluated by the Working Group, but could also contribute to facilitating the harmonization between the classification of hazardous substances carried by ships and those developed for other transportation modes, without unduly changing the current profiling system.

2.2 The Working Group noted that a new evaluation system, if adopted, would need to be reflected in the various implementation and interpretation guidelines to the relevant provisions of MARPOL 73/78. The preparation and adoption of such guidelines in connection with necessary amendments to the MARPOL 73/78 Convention, e.g., its Annex II, Appendix I, might take several years. During this time, the current hazard procedure and the revised new system would co-exist and both new and revised hazard profiles under both of these systems would need to be assigned to chemicals.

2.3 The Group considered in detail the criteria and the types of ranking that could be assigned for hazard evaluations in the new scheme. In this regard, particular attention was paid to the completeness of the hazard scheme, the description of the specific criteria, and the availability of the most appropriate test

methods for reliable measurements. The results of these considerations are reflected in paragraphs 2.4 to 2.30 below.

Column A: Bioaccumulation

2.4 The Working Group agreed that column A should be divided into two sub-columns: A1 to represent information on the log octanol/water partition coefficient (log Pow) of a substance, and A2 to represent information on bioconcentration in fish, represented by the bioconcentration factor (BCF). A numerical ranking system would be developed reflecting bioaccumulative tendencies.

2.5 The ratings should be based on a log Pow and, where appropriate, on a bioconcentration factor (BCF) measured on the basis of recognized testing methods with fish as the target organism. The Working Group agreed that log Pow values calculated according to a published method (e.g. ASTM) would be acceptable. In some cases, however, e.g. for hydrophobic compounds, measured log Pow values would be essential. Approved testing protocols such as OECD 107, OECD 117 or a slow stirring method should be used.

2.6 The Working Group noted that substances with a log Pow of ≥ 4 should be considered to be of concern with regard to bioconcentration. In such cases, measurements of bioconcentration factors in "standard" fish should be requested. The log Pow values tend to provide conservative data on the potential of a substance to bioaccumulate, whereas a measured BCF can provide definitive information on the potential for a substance to bioaccumulate; this may often result in less severe hazard ratings, due to processes such as metabolism which may in turn enhance excretion of a chemical from fish.

2.7 It was pointed out that substances with very high log Pow values (>8) are presumed to be so insoluble in water as to pose no further potential for bioaccumulation. It was further noted that at higher values, the calculated log Pow becomes increasingly inaccurate at predicting bioconcentration, and that for more hydrophobic chemicals, measurements of the octanol/water partition coefficient are necessary.

2.8 The Working Group further advised that the above conclusions were applicable to organic chemicals only. In order to evaluate the bioaccumulation potential of non-organic and organo-metallic compounds, measurements of their bioconcentration in fish was necessary. Recognized testing protocols such as OECD 305C or OECD 305E flow-through tests, or alternatively the relevant ASTM or US-EPA guidelines could be used.

Column B: Aquatic toxicity

2.9 The Working Group agreed that as well as representing results from acute aquatic toxicity tests, column B should, for certain substances, also include information on their chronic toxicity. Hence, column B will also be split.

B1: Acute toxicity

2.10 The Working Group agreed that data from three standard tests should be requested:

- a 96hr LC₅₀ fish test;
- a 48-96hr LC/EC₅₀ crustacean test; and
- a 72hr microalgal growth inhibition test (72hr IC₅₀).

The lowest LC₅₀, EC₅₀ or IC₅₀¹ (i.e. highest toxicity) value should be used for assigning a hazard rating.

¹ Inhibition concentration

2.11 The Working Group further agreed that the acute toxicity ratings should be extended to cover the range from >1000 mg/l down to <0.01 mg/l. The intervals of the ratings should be separated by a factor of 10, i.e., from 0 (>1000 mg/l = non hazardous) to 6 (<0.01 mg/l = extremely toxic).

B2: Chronic toxicity

2.12 The Working Group agreed that tests on chronic toxicity (i.e. long-term in duration of test, and measurement of sublethal responses) (Rand, 1995)² should be requested for substances with high hazards regarding their acute toxicity, bioaccumulation and persistence. Such tests could include:

- sub-chronic toxicity tests, e.g., 28d OECD extended fish test; the 21d OECD Daphnia reproduction test; and early life stage fish or invertebrate tests;
- partial and full-life cycle data, e.g. from long-term fish or invertebrate tests; and
- information on specific long-term effects on aquatic organisms, e.g. endocrine effects, reproductive effects.

The data should be expressed as a median Effective Concentration EC₅₀ or No Observable Effect Concentration (NOEC), following a defined length of exposure.

2.13 The Working Group considered that a rating based on the above mentioned numerical toxicity scale could be used for indicating substances with a (sub)chronic lethal toxicity in column B2. It was further noted that substances with a known chronic sublethal toxicity at low, environmentally realistic concentrations (i.e., data obtained from published sources) could be indicated in sub-column B2 by an asterisk.

2.14 The Working Group expressed the view that the additional information on chronic toxicity would be useful in resolving conflicts between acute toxicity and bioaccumulation test data, particularly in the case of poorly soluble substances. Where acute toxicity/bioaccumulation data were conflicting, (sub)chronic data may help to decide whether the material was so insoluble as to pose no hazard, or whether indeed it poses a hazard to the marine environment.

Column C: Acute mammalian toxicity

2.15 The Working Group noted that skin contact and inhalation are equally important exposure routes as, and in some cases more important than ingestion. It therefore proposed that these two potential routes of exposure should be added to column C.

C1: Peroral toxicity

2.16 The Working Group agreed that the ratings currently used for Column C (Hazard to human health by oral intake), i.e. in intervals from rating 4 (highly hazardous, LD₅₀<5 mg/kg) to rating 1 (practically non-hazardous, LD₅₀>5000 mg/kg) will continue to be used. Wherever possible, acute peroral LD₅₀ data will be based on standard 14d post-dosing observation tests with rats (such as in the standard tests OECD 401, 402, 403). However, other test data obtained from the literature using other protocols for other mammalian species, if considered acceptable after careful review, would also be used in assigning hazard ratings. In general, when data are available for several species the lowest LD₅₀ value will be used as a basis for classification, unless there are validated reasons not to adopt this procedure in a particular case.

² Rand, G.M. Ed. 1995. Fundamentals of Aquatic Toxicology. Effects, Environmental Fate and Risk Assessment. Taylor and Francis, Was., D.C. 1125p.

C2: Percutaneous toxicity

2.17 The Working Group agreed that data from acceptable standard tests with rabbits as the target animal are preferred, using 24hr occlusion with two weeks of observations. Criteria will be developed using a 0 to 4 rating system similar to that established in sub-column C1.

C3: Inhalation toxicity

2.18 The Working Group agreed that data from acceptable standard tests with rats as the target animal are preferred, using 4hr LC₅₀ studies where possible. Criteria will be developed using a 0 to 4 rating system. Threshold limit values (TLV) will also be considered when supplemented by other data, particularly for irritation responses of the respiratory tract system caused by vapour exposure.

Column D: Other adverse mammalian health effects

2.19 In order to give a more informative profile, the Working Group considered that it was appropriate to present skin and eye irritation separately, and to create a new sub-column for other specific health concerns.

D1: Skin irritation and corrosivity

2.20 The Working Group agreed that a 0-4 numerical rating can be developed for this particular health hazard in order to harmonize with the other rating systems.

D2: Eye irritation and corrosivity

2.21 Due to the wide range of ocular injury that can occur from chemical exposure, and the different time interval at which such damage develops after exposure, the Working Group noted that this type of injury is a more difficult health effect to rate than skin irritation. However, the Group felt that a 0-4 numerical rating system can be developed for this health hazard.

D3: Other adverse health effects

2.22 This sub-column would consider all mammalian toxicity and potential and known human health effects other than those specified in the columns C, D1 and D2 above. It would include, for example, identification of specific organ or tissue injury following acute or repeated exposure, developmental toxicity, reproductive toxicity; carcinogenicity; respiratory sensitization, skin sensitization; and biochemical lesions. These injuries would be indicated as YES, NO or BLANK (-), and would form the basis for the entry to be included under "REMARKS".

Column E: Other uses of the sea

2.23 The Working Group agreed that the current column E indicating effects on amenities should be expanded to cover potential effects on other uses of the sea as a result of operational discharges and accidental spills of chemicals from ships. In addition to interferences with the use of beaches, this column should include effects of tainting substances on fisheries, blanketing of the sea-bed by sinking substances, and effects on seabirds, marine mammals and other wildlife due to the presence of non-toxic persistent floating substances.

E1: Effects on beaches

2.24 The Working Group agreed that the current rating system under column E would continue under E1, replacing the "X"s with numerals (0-3).

E2 Effects due to unique physical/chemical properties, including consideration of potential hazards to marine wildlife

2.25 The Working Group noted that this column should consider properties that lead to substances behaving as persistent floaters and sinkers/smotherers and which are rated as "D" in column B of the current system. Floaters, in particular, affect wildlife (e.g. seabirds and marine mammals) and sinkers/smotherers affect bottom habitats and benthic organisms. It was decided that the descriptive rating system (using letters) based on the "Classification System for Chemicals Spilled at Sea" used by Parties within the framework of the Agreement for Co-operation in Dealing with Pollution of the North Sea by Oil and Other Harmful Substances, 1969 and by Parties within the framework of the Convention on the Protection of the Marine Environment of the Baltic Sea, 1974, may be considered for this column, i.e., "F" for floating substances that would not evaporate or dissolve quickly, and "S" for sinking substances that would deposit on the sea-bed (these substances were originally given a rating of "D" under column B).

E3: Tainting of fisheries products/odour threshold in water

2.26 The Working Group agreed that in the absence of data to indicate the potential of a substance to taint seafood, the hazard profile could record the sensory properties of the chemical, indicated by its odour detection threshold in aqueous solution (see Report of EHS 30, 1995).

2.27 Four symbols could be used, defined as follows:

- "T" the substance has been tested for tainting of seafood by exposing fish or shellfish to the substance in the ambient water followed by sensory assessment of the exposed fish, and found to taint at concentrations at or below 1 mg/l;
- "Od" the odour detection threshold of the substance in aqueous solution is 1 mg/l or less;
- "0" the substance has been tested for tainting and found not to taint below 1 mg/l; or the odour detection threshold in water is above 1 mg/l; or consideration of odour properties is not appropriate for the substance;
- "NE" there is no evidence to support one of the above ratings (T, Od or 0).

Note: where there is data on both tainting and on odour detection threshold for a substance, the rating will be based on data on tainting, unless otherwise noted.

Column F: Biodegradation

2.28 The Working Group agreed that in view of the fact that biodegradation tests would be indicative of the ability of a substance to biodegrade in the marine environment, this new column in a revised hazard rationale could follow in sequence to columns A and B.

2.29 The Working Group agreed that the definition used within the European Union of "ready biodegradability" of substances should be applied. This is based on >60-70% biodegradability (CO₂ evolution/O₂ consumption, DOC methods) in 28d tests. Preference was given to the OECD 306 biodegradation test developed for marine environments; however, data resulting from appropriate freshwater tests (e.g. OECD 301 A-F, or their EC or ISO equivalents) could be accepted. Ratings could be expressed as follows:

- R = readily biodegradable
- NR = not readily biodegradable

NT = not tested.

REMARKS Column

2.30 This should be used for remarks as in the current evaluation procedure, such as specific health concerns that form the basis for the D3 entry (see paragraph 2.22 above), information pertaining to physical or chemical properties (e.g., reaction with seawater). The Working Group further agreed that health concerns based on food chain contamination (i.e., food contaminant) should be flagged in the Remarks Column by an appropriate comment. The suspicion for such concerns would be based particularly on consideration of the following: bioaccumulation, persistence, and known human adverse health effects (see paragraph 3.3 of annex 3). Additionally, the Remarks Column should also note a "candidate for review" based on a suspicion of particularly adverse effects to the marine environment (see paragraph 2.2.3 of annex 3).

Additional work

2.31 The Working Group identified a number of tasks that still needed to be finalized before a complete proposal for review could be submitted to GESAMP. These tasks were related to fine tuning of the hazard assessment criteria, producing a new outline for the hazard profiles and the composite list, definition of hazards and effects, and a revision of the questionnaire requesting data on substances carried by ships for evaluation by GESAMP. Such work should be carried out by correspondence. For a review of the data files in a revised composite list, Prof. T. Syversen undertook to act as focal point. For work related to the revision of the questionnaire, Mr. M. Morrisette will be responsible. Prof. B. Ballantyne will review the wording of the criteria in the legend to the current procedure (Rep.Stud.No.35, annex 5) and will also prepare a list of definitions which would form part of a revised composite list.

3 WORK CARRIED OUT INTERSESSIONALLY

Review of Column B (Damage to living resources)

3.1 A working document summarizing the available aquatic toxicity data for those compounds up to EHS No.250, which had had a "4" assigned in column B (highly toxic, $LC_{50} < 1$ mg/l), was considered by the Working Group with a view to possibly upgrading certain substances to a rating of "5" (extremely toxic, $LC_{50} < 0.01$ mg/l). Because of time constraints, one member of the Group undertook to work through the list during the next intersessional period, adding new data where these could be found.

Alcohol ethoxylates and Alkylbenzene sulphonates

3.2 A review of the profiles for alcohol ethoxylates and alkylbenzene sulphonates was deferred for consideration at a future meeting of the Working Group.

Lead compounds

3.3 One member of the Working Group reviewed the available literature for evidence of teratogenic effects of tetraethyl lead and tetramethyl lead. The available literature indicates that the compounds are not teratogens.

Review of phthalates

3.4 In a review of the "phthalate" class of compounds, a uniform rating of "XX" was given to all compounds, where the carbon atom content of the alcohol moiety was six or more. A new entry was created for "dihexyl phthalate". The hazard profile for this new compound and the revised profiles for phthalates are listed in annex 4.

Tainting of esters

3.5 A review of esters for their potential to taint was undertaken by one member of the Working Group. The Group supported the introduction of a "T" rating in a large number of cases. However, it was agreed to defer the introduction of these ratings until the method of analysis, i.e., the odour threshold test, upon which they were based, had been reviewed and published. The esters review paper is set out in annex 5. The Secretariat was requested to contact chemical manufacturers' associations with a view to receiving their comments on the methodologies described in the paper, i.e., on the odour detection thresholds of chemicals in aqueous solutions.

Composite list database

3.6 The composite list database had been distributed to members of the EHS Working Group and a few other known users of the GESAMP hazard profiles, who had been asked to report any problems regarding the installation and use of the database. Very few comments have been received and the database is now ready for a wider distribution.

4 Correspondence with the chemical industry

4.1 Various questions arising from correspondence with the following chemical companies during the intersessional period were addressed by the Working Group:

RKS
Chemical Products Corporation
Bayer AG
Lubrizol
ICI ChlorChemicals
Zeneca AG Products
Lignotech Norway
Hüls
Ethyl Petroleum Additives Ltd.
Exxon Chemical Company
Röhm GmbH Chemische Fabrik
Akzo Nobel

4.2 Hazard ratings and some nomenclature problems of the following substances were considered by the Working Group:

Diisopropylnaphthalenes
 Barium compounds NOS
 1-(4-Chlorophenyl)-4,4-dimethylpentan-3-one
 Alky sulphonic acid ester of phenol
 Alkyl ester copolymer (C₄-C₂₀)
 Chlorinated paraffins (C₁₄-C₁₇)
 EPTC (ISO)
 Ammonium lignosulphonate
 Calcium lignosulphonate
 Sodium lignosulphonate
 Poly(4-12)ethylene glycol alkyl(C₇-C₁₁)phenyl ether
 Alkyl(C₈-C₉)phenylamine
 HiTEC 4728
 HiTEC 4738
 Ethoxylated alkyloxyalkylamine
 Reaction products of fatty acid, alkylamine, polyolefin
 Metal fatty acid salt
 Metal long chain alkyl acid salt
 Viscoplex 5011B
 Dodecyl/octadecyl methacrylate mixtures
 Röhm monomer 6615
 "Butylated triaryl phosphates"

The respective hazard profiles are listed in annex 4.

Diisopropylnaphthalene

4.3 The Working Group considered a report on the toxicities of diisopropylnaphthalene, prepared by an independent consultant as requested at EHS 30 by the Group. It concluded that this report revealed no new information, but that the data that were available to the Working Group appeared not to have been included in the review. The Working Group agreed that this additional information should be made available to the company. A re-test for acute toxicity was not considered worthwhile, taking into account the environmental data available to the Group.

NOS ("not otherwise specified")

4.4 The Working Group reaffirmed its belief that a hazard profile in the composite list allocated as an "NOS" entry should cover the most hazardous ratings of the relevant compounds found in the Composite List. Where a company wished to transport a substance that they believed to be significantly less hazardous than the NOS profiles provided for, it should be urged to submit details of the substance, supported by relevant hazard data, for inclusion as a specific entry in the composite list. It was also suggested that attention should be drawn to the need for NOS entries to be used carefully, properly and responsibly, and that users should be made aware of their conservative nature.

Alkyl sulphonic acid ester of phenol

4.5 Information provided for the review of "alkyl sulphonic acid ester of phenol" in respect of aquatic toxicity indicated that correct procedures for handling "water accommodated fractions" had not been followed and original reports were not available. Consequently re-testing was needed, following approved

methods, which should be reported in full. A measured value for log Pow was needed, as well as data from a recognized bioaccumulation test.

Chlorinated paraffins

4.6 No change was made to the two entries covering "chlorinated paraffins (C₁₄-C₁₇)". However, a new entry was created for "chlorinated paraffins (C₁₄-C₁₇) containing less than 1% shorter chain length paraffins".

Polyolefin amine alkenamine

4.7 The name "Reaction products of fatty acid, alkylamine, polyolefin" was changed to "polyolefin amine alkenamine (C₁₇+)" to bring it in line with the name proposed in relevant IMO documentation (ESPH 1/INF.3, ESPH 1/4/2, annex 1).

Copper salts of fatty acids

4.8 The two entries "metal fatty acid salt" and "metal long chain alkyl acid salt" were combined under the single heading "copper salts of long chain (C_x-C_y) fatty acids" and the chemical company was requested to supply information on the relevant chain lengths. The more stringent requirements from the current entries were retained.

Butylated aryl phosphates

4.9 Further discussions subsequent to EHS 30 took place on the proposed entry for "butylated aryl phosphates". In order to make the entry more specific in relation to the compounds to be covered, a revised name was suggested, *viz.* "triphenyl phosphate/tert-butylated triphenyl phosphates mixtures, containing 15%-48% of triphenyl phosphate". Certain discrepancies in the information were noted and still needed to be clarified, *i.e.*, the acute aquatic toxicity of the compounds with the lowest and highest triphenyl phosphate (TPP) contents. In addition, a new entry for "triphenyl phosphate" was created and a provisional profile assigned.

5 EVALUATION OF NEW SUBSTANCES PROPOSED FOR BULK CARRIAGE BY SHIPS

5.1 The data provided for the following new substances were considered by the Working Group and profiles were assigned:

Calcium nitrate solution
Potassium formate solutions (75% or more)
Degummed C9

Hazard profiles are listed in annex 4.

5.2 It was decided that since the hazard profiles for "calcium nitrate" and for "calcium nitrate solution" were the same, the two entries should be combined under the description "Calcium nitrate, and 40-50% solutions".

5.3 The Working Group considered that the potential for skin and eye irritation for the "potassium formate solution (75% or more)" needed to be confirmed. One of the members undertook to review the available literature and to report back to the Secretariat as soon as possible.

6 FUTURE WORK AND DATE OF NEXT SESSION

The Working Group identified additional issues to be considered during the intersessional period in regard to the establishment of a revised hazard evaluation procedure for submission to GESAMP XXVI, as mentioned in paragraph 2.31 above. Other tasks were assigned to individual members of the Working Group for presentation of results at EHS 32. This thirty-second session of the Working Group was planned to be convened from 20 to 24 May 1996.

7 ANY OTHER BUSINESS

7.1 The Secretary informed the Working Group that GESAMP at its twenty-fifth session (Rome, 24 to 28 April 1995) had expressed concerns on two matters with regard to the status of the marine environment. One was the use of triazine-based herbicides as a component in antifouling paints, and the other was the discharge to the marine environment of substances with oestrogenic effects (i.e. oestromimetic chemicals)

Triazine-based herbicides

7.2 GESAMP at its twenty-fifth session had noted that since the phasing out of tributyltin (TBT) as an antifouling agent on vessels <25 m, companies had turned to copper-based substitutes. These, however, were not particularly effective and paint manufacturers are presently incorporating triazine-based herbicides as extra additives. High levels of products of these substances have been detected several kilometres away from yacht marinas. GESAMP was concerned that this may lead to an inhibition of growth in localized natural phytoplanktonic and algal communities. Furthermore, there was a paucity of data on the environmental fate and toxicity of these substitute chemicals. GESAMP requested the EHS Working Group to evaluate the hazards of these TBT substitutes and to inform the next session of GESAMP in 1996 of the results.

7.3 The Secretariat had contacted the manufacturer of one of the triazine-based compounds used as an additive in antifouling paints: IRGAROL 1051.

7.4 The Working Group noted that this compound is one of a family of about 15 to 20 variants based upon 1,3,5-triazine as the active ingredient. All members of this family exhibit similar aquatic toxicities. The toxicities towards algae, however, are at least 2 orders of magnitude greater than those towards fish and crustaceans. The rating "5" (extremely toxic) assigned to column B was based upon its toxicity to algae. As far as biodegradation was concerned, the chemical itself could be responsible for killing bacteria that would otherwise lead to its degradation. Due to their persistence the compounds do accumulate in sediments at and near locations where they are used, and this may result in problems regarding dredging operations and disposal of contaminated sediments. The triazine compounds may also affect salt marshes and benthic diatoms. In this regard, national administrations should be encouraged to initiate monitoring studies on these compounds in sediments and sea water.

7.5 The material received by the Secretariat referred to bioaccumulation studies carried out with IRGAROL 1051. The Secretary was requested to ask the manufacturer for copies of the relevant test protocols. One member of the Working Group undertook to distribute a study on triazine herbicides to the Group members. The Working Group undertook to collect information on triazine compounds for continued consideration at future meetings.

7.6 The hazard profile of this substance is included in annex 4.

Oestromimetic chemicals

7.7 GESAMP noted that recent data from freshwater environments show that a range of substances (including DDT, PCBs, dioxins, PAHs) can have oestrogenic effects on fish, for example, whereby male fish develop female organs. The surprising finding is that a wide variety of different chemicals have the same effect even though their chemical structure may be different from natural oestrogens. Concern is also being expressed about the action of these endocrine irritating chemicals in humans where they have been rightly or wrongly implicated in decreasing male sperm counts. GESAMP believes that this is a matter of wide potential concern and urges that research efforts be devoted to the study of the potential effects of endocrine irritating chemicals in the marine environment.

7.8 IMO requested the Working Group to consider whether discharges into the sea from chemical tankers of residues of noxious liquid substances evaluated by the EHS Working Group might contribute to the potential effects of these substances in the marine environment.

7.9 The Working Group noted that the potential effects of oestromimetic chemicals have recently been the subject of intensive research activities, although related problems had already been identified a decade or more ago. In 1995 alone, six international conferences (including SETAC) have been convened to discuss results emanating from research carried out in this area of concern. However, the results reported on sperm counts have so far not been supported by good statistical analyses. With regard to the potential effects on marine life, test protocols are not as yet available.

7.10 The Working Group agreed that it was beyond its competence to provide advice at this stage due to the ongoing developments and complexity of this subject area. Members of the Group would, however, carefully follow developments in research in this field that is currently in progress. The Secretariat may also wish to invite an expert to one of its future sessions to advise on how a hazard rating system might be established once the relevant bioassays have been developed.

8 CONSIDERATION AND ADOPTION OF THE REPORT

The Working Group considered and adopted the report of its thirty-first session on 1 September 1995.
